

BOTANY

Project title: ***Cortinarius* in Yellowstone**

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Objective: Taxonomic studies in the genus *Cortinarius* and related genera, including general ecology, phenology, geography, and photography and painting of specimens.

Findings: 1999 was one of the poorest collecting seasons in the past fifteen years, therefore, success was limited. Collection made by investigators are recorded by genus below followed by a number indicating the total number of collections. *Cortinarius*, 7; *Inocybe*, 16; *Clitocybe*, 2; *Peziza*, 1; *Mycena*, 2; *Lactarius*, 2; *Galerina*, 3; *Russula*, 2; *Laccaria*, 1.

Project title: **Parkwide Seedbank**

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Additional investigators: Sam Reid, Cheryl Decker, Stephanie Cochrane, Orvin Loterbauer

Objective: Collect and catalogue native seed to be used for parkwide roadway disturbance.

Findings: Seed collection continues to accumulate an adequate amount for revegetation of roadway and construction disturbance.

Project title: **Lichens of Yellowstone National Park: Phase II**

Principal investigator: Dr. Sharon Eversman
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Additional investigators: Clifford Wetmore, Katherine Glew, James Bennett

Objective: The objectives were to: 1) Further the completion of an inventory of lichens of Yellowstone National Park; and 2) Collect two species, *Bryoria fremontii* and *Letharia vulpina*, for element analysis of their tissues.

Findings: Three hundred sixty-four lichens species in 105 genera have now been identified from 84 sites in Yellowstone National Park; 190 species were reported from the park for the first time. Douglas fir bark burned in 1988 is being re-colonized by eight species, and burned soil in a Douglas fir forest zone is being re-colonized by two species.

Forty-three species have been reported as being sensitive or intermediately sensitive to air pollutants. *Bryoria fremontii* and *Letharia vulpina* tissues analyzed for elemental content show that, except for mercury, the levels of most elements were similar to those recorded in other parts of the region. The final report, Lichens of Yellowstone National Park, Phase II, has been completed and printed. A copy was sent to YNP.

Project title: **Vascular Flora of the Greater Yellowstone Area**

Principal investigator: Erwin Evert
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Objective: To collect vascular plant specimens as vouchers for distribution maps to be included in the investigator's Flora of the Greater Yellowstone Area. For other objectives, see the investigator's research proposal outline.

Findings: Six vascular plant species previously unreported for YNP were collected: 1) *Chorispora tenella*; 2) *Ranunculus acris*; 3) *Picea glauca*; 4) *Rumex utahensis*; 5) *Myosurus minimus*; and 6) *Carex leporinella*. #1 Black Canyon, #2-4 Slough Creek drainage, #5 and 6 Pelican Creek drainage. In addition, five seldom seen species were collected: *Arenaria serpyllifolia*, *Viola canadensis*, *Carex concinna*, *Oryzopsis asperifolia*, and *Onobrychis viciifolia*.

Editor's Note: The following speices, *Chorisporea tenella*, *Ranunculus acris*, *Picea glauca*, *Myosurus minimus*, and *Carex leporinella* have been previously reported for Yellowstone National Park.

Project title: **Wetland Conservation Planning**

Principal investigator: Robert Moseley

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Objective: Compile a centralized wetland information system for Idaho and prepare wetland conservation plans by watersheds. The first watershed done under this project was the Henrys Fork basin, including the Idaho portion of YNP.

Findings: Inventories were conducted in the Henrys Fork basin but not in Yellowstone National Park this year.

Project title: **Remote Sensing of Aspen Change on the Northern Range of Yellowstone National Park**

Principal investigator: Dr. William Ripple

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Additional investigators: Eric J. Larsen

Objective: Historical aerial photography will be used to analyze aspen and conifer canopy cover change over a 40-year period on the northern range of Yellowstone National Park and on adjacent public lands in the Shoshone and Gallatin national forests. Aspen cores and belt transect information will also be collected to aid in the analysis. The specific objectives of the study are: 1) Using aerial photography, map changes in woody vegetation on YNP's northern range and on selected comparable plots in the Shoshone and Gallatin national forests. 2) Compare changes in aspen/conifer canopy coverage on the northern range plots with changes observed on the Shoshone and Gallatin National Forest plots. 3) Integrate field-collected transect and core data with remote sensing results to attempt to determine the

causes for any observed differences.

Findings: At the conclusion of the 1999 field season, data had been obtained from 94 randomly selected plots in YNP, 97 plots in the Shoshone National Forest, and 67 plots in the Gallatin National Forest. Preliminary analysis of the data indicates that YNP aspen stands may have a different age structure than those in the adjoining national forests, including the elk wintering areas of the Sunlight/Crandall basins of the Shoshone National Forest. The data are being analyzed to compare age distributions, sucker densities, bark damage to boles, browsing intensity, and the degree of conifer invasion in aspen stands. Using paired sets of aerial photographs, aspen/conifer canopy cover change for the period 1954-1992 (1958-1995 in the national forests) is still in progress.

Project title:	Physiology of Thermotolerant Plants in Yellowstone Park
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Objective: Our chief objectives for 1999 were to continue to monitor the rhizosphere temperatures of plants growing in several geothermal areas in Yellowstone and to begin a systematic vegetative pattern survey in these areas.

Findings: This year we collected additional data logger temperature data regarding long-term (weeks to months) rhizosphere temperatures of the grass species *D. lanuginosum*. These results were in general agreement with results from previous years; that is, that the roots of this plant are exposed to temperatures exceeding 40° C for weeks. In addition, we collected vegetative pattern data in selected areas at Amphitheater Springs, 100 Springs Plain, and Rabbit Creek. At this time the data is inconclusive regarding correlations between physical factors and species distribution in geothermal areas. We plan to continue this research next year.

Project title: **Yellowstone Flora**

Principal investigator: Jennifer Whipple

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Objective: The vascular plant flora of Yellowstone, even though investigated for approximately 120 years, is not completely known. The primary focus of this project is to improve the current knowledge of the flora of the park through in-depth collecting, especially park areas which have not been previously studied. This includes inventory of the occurrence and range of native taxa and also involves the documentation of the arrival and spread of exotic species. In addition, collection of specimens for the Yellowstone herbarium will improve the value of the facility for both NPS personnel and outside researchers.

Findings: Ongoing inventory of vascular plants and collection for the Yellowstone National Park Herbarium (YELLO). Seven species of vascular plants previously not reported as occurring within the park were discovered. *Cymopterus nivalis* Wats. (snowline cymopterus), *Thlaspi montanum* L. (wild candytuft), *Mirabilis linearis* (Pursh) Heimerl (narrowleaved four-o'clock), *Orobancha corymbosa* (flat-topped broomrape), and *Carex nigricans* Retz. (black alpine sedge) were all located apparently for the first time in the park. These native species are presumed to have been a long-term component of Yellowstone's flora that had been previously overlooked. Additionally, two new exotic species were discovered and subsequently eradicated. *Daucus carota* L. (Queen Anne's lace) was located by West District resource management personnel, and *Arctium minus* (Hill) Bernh. (burdock) was discovered in the lawn of a residence in lower Mammoth. In addition, *Listera convallarioides* (Sw.) Nutt. (broad-lipped twayblade), originally collected in 1885 but subsequently not relocated, was confirmed to occur within the park.